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ABSTRACT

This paper outlines a range of ways that technology education can be incorporated into existing curricula without compromising those programs, the technological skills and knowledge advocated in the 1994 technology statement of the Curriculum Corporation of Australia, or the children and teachers themselves. A case study of a year-two teacher is presented to illustrate creation of a developmentally appropriate environment to involve children in thinking about the processes entailed in technology education. The proposed methods emphasize the need for technology education to be implemented in real life and not in artificial situations wherein children are asked to construct something. A series of examples is offered on how to create real-life situations based on existing curriculum routines, the arrangement of the physical environment, and the children's questions. The paper suggests that although there may be other ways that technology can be introduced to very young children, technology education--with its emphasis on designing, making, and appraising materials, systems, and information--extends children's learning opportunities. This framework provides for children another way of thinking as they engage in manipulating systems, information, and materials. (AA)

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ED 402 028

CREATING TECHNOLOGICAL LEARNING CONTEXTS IN EARLY CHILDHOOD SETTINGS

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Are you looking for some practical ideas about how to teach technology education? Do you want to know how to squeeze technology education into an already croweded curriculum? Are you interested in broadening your ideas about what technology education looks like in practice? If you said yes to these three questions, then come along to this presentation.

This session will demonstrate a range of different ways that technology education can be introduced to young children (3 - 8 years). Material developed for the book *I can make my robot dance: Technology for 3 - 8 year olds* (Curriculum Corporation of Australia, 1995) will be shared. Video segments of technology programs in action will be shown, and children's worksamples and transcripts of childen's technological thinking will feature.

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Introduction

Since the release of the curriculum statements and profiles, we have heard teachers debate the benefits and limitations of outcomes based education. Of particular interest has been the concern for how best to implement the eight key learning areas in ways which ensure connected and relevant learning experiences for children. As teachers begin to familiarise themselves with the curriculum statements and profiles (in whatever form they take in each state and territory) comments such as the following are heard:

> *Here is another key learning area to read about (technology statement and profile). How can I include technology in an already crowded curriculum in a way that will be effective and genuine for my children?* (Karina's diary, Year Two teacher)

Technology has been met with great enthusiasm by those who have taken the challenge and embraced this key learning area. This same teacher (above) analysed her program to see how to integrate technology into what she was already doing, by asking some key questions:

> *Which areas of the curriculum am I teaching or planning to teach, which lend themselves to integration with technology? Which elements of technology can be taught independently so as to enable the children to gain a clear understanding of technology?* (Karina's diary, Year Two teacher)

This paper outlines a range of ways that technology education can be incorporated into teachers' existing programs without compromising that program, the technological skills and knowledge advocated in the technology statement (Curriculum Corporation, 1994) or the children and teachers themselves. Further ideas can be found in *I can make my robot dance. Technology for 3 - 8 year olds* Curriculum Corporation of Australia, 1995* .

Technology in context

Written by Marilyn Fleer and Jane Sukroo

PS 024728

(Technology) involves the purposeful application of knowledge experience and resources to create products and processes that meet human needs.

The needs and wants of people and groups in particular communities determine what technologies are developed and how they are applied. Particular technological applications are judged by their impact on communities and environments and their effect on the personal wellbeing and ways of life of individuals (Curriculum Corporation, 1994: 2).

What does this definition mean for very young children? How can we develop teaching programs which capture the spirit of these statements? When technology is considered as an integral part of what children already do and is situated in a meaningful context, the purpose becomes explicit for children. For example, when Karina looked at what she was already doing with her children in her classroom a great deal of technological activity was already taking place:

A favourite activity for the children is making new inventions, making houses for pets and creating a variety of items from junk materials or construction kits. It won't be hard to tap into this existing activity and make the technological element of it more specific Karina's diary, Year Two teacher)

Karina organised her classroom so that the daily program provided many opportunities for self-directed and self-chosen activities through what she called *learning centres*. Her classroom contained a number of physically defined curriculum areas housing different resources and equipment. Children planned their activities for the session, carried out their plans and at the end of each day reflected on what they have achieved and learnt. At the end of each week individuals and small groups presented their work to the whole group.

In this environment it was very easy for Karina to focus on technology education. Karina was able to explicitly involve her children in thinking about the processes involved in technology education. As a result the children discovered that designing, making and appraising materials, information and systems, is interrelated in nature. She did not plan experiences for specific processes. For example, Karina and her children developed a number of key statements which reflected the technological process:

When we Design, Make and Appraise (DMA) we:

1. Draw a design of what we plan to make and share it with the teacher.
2. Make the item, following the design.

3. Write about the item so that others can read about it.
4. Talk to the teacher about ways the item could be improved or changed, and include these ideas in the written explanation.
5. Display the item in the classroom or school with the statement.

However, the children also found that they could start the process by making something first, then appraising what hey had made, followed by drawing a design of the finished product! The children's chart indicates this process:

When we Make, Appraise and Design we:
1. Make the item.
2. Write about the item and then read about it.
3. Talk to the teacher about ways the item could be improved or changed, and include these ideas in the written explanation.
4. Make a design of the item or the appraised item.
5. Display the item and the design.

The process did not finish there for the children. They also had in their room the following chart:

We can also Appraise, Design and then Make:
1. Play with the materials.
2. Appraise the materials and think about how they could be used.
3. Design the item.
4. Make the item.
5. Evaluate it.
6. Write about it and talk to the teacher.
7. Display the item.

Technology education for these children provided them with another way of thinking as they worked with materials, information and systems. Since the children organised themselves into small groups or acted independently, the charts displayed around the room (which had been jointly constructed by the children and the teacher), provided explicit steps they could use as they worked. The classroom context that had been established before technology had been introduced was maintained. However, the children had a valuable thinking tool to now use as they worked in the learning centres. Learning opportunities were broadened as a result of introducing technology education into this classroom.

Introducing technology to young learners

Not all classrooms in the early years are organised into learning centres. In

more traditionally organised classrooms greater effort is required to introduced technology education. Technology education is more than setting aside an hour in which the children are asked to build a bridge from newspapers with a view to it supporting a match box car! This activity is certainly technological, but the context is much more artificial than when a real human need arises in the classroom - such as organising a new lunch ordering and collecting system. The appraisal of this system is real - who would want the wrong lunch or one that is cold because it did not get to the classroom quickly enough?

Focusing on the physical environment

Human needs do not always arise in classrooms regularly enough for teachers to say they are implementing a technology program. Situations can be created which do not compromise teachers' programs - but rather enhance them. For example, children can be involved in designing, organising and using a new classroom layout. If the children are invited to design their own classroom layout a great deal of technological activity and learning can be generated.

Most young children will have well formed views about where they would like to sit in a classroom. Similarly, they will have ideas about the placement of equipment and materials around the room. Their plans may not always be safe, such as blocking a fire escape, or practical such as placing the computer far from a power point. However, in using the room they will actively appraise these factors and re-design. This idea can be extended to the playground as well.

Children can be easily involved in re-designing parts or all of their school playground. This can be done inexpensively through a community project, where found or donated resources are used. Individuals or small groups can submit plans for consideration by a committee made up of adults and children. The stimulus could be a competition. The design brief for this project could involve all the children in the school. For example, interested children could observe how the existing school playground is being utilised. Individuals could be interviewed about their likes and dislikes. Potential problems relating to safety could be sought through interviewing the school nurse, organising a questionnaire relating to problem spots or talking to teachers on playground duty. Similarly, interested children could make enquires about bullying or disproportionate use of the various areas in the

playground. From this data, interested children could begin to develop a design brief. This design brief could also act as the selection criteria for the competition.

Focusing on existing routines

Whilst children can be actively involved in designing, organising and playing in their physical environment, they can also take charge of daily routines. For example, the children can brain storm all the things they believe they do at school and begin to consider different ways the timetable can be arranged! Whilst this would need to be carefully orchestrated by the teacher, through setting some non-negotiable perimeters such as lunch bells, these constraints would naturally fit within the brain storm - things we cannot change! Whilst changing the whole timetable may seem too adventurous, there are routines within the day that can be modified by the children, such as news time.

There are special events which also take place in schools such as birthday parties, school fetes, athletics carnivals, assembly to name but a few. Children can also take part in organising these special routines. Bernadette a kindergarten teacher (first year of school in the ACT) involved her children in preparing some of the food for their fund raising at their school tuck shop. In preparation for this the children brain stormed what would be involved. They decided to plan their recipes (many children invented their own, trailing them at home with the family), design advertising charts, jingles that could be played over the Public Address system, and invented chants that hawkers could use in the playground. At the conclusion of the day, the children went around and interviewed (using tape recorders) other children about what they had purchased, asking them to make any comments about how they had decided on their purchases. This information was summarised and shared with the whole group in an effort to appraise which advertising worked best!

As a follow on from this work the children also started to critique advertisements in magazines, on TV and on the radio. In the process of doing this, a number of ethical dilemmas had to be worked through! Although the Children were young in age, they discussed the gender stereotyping of many of the advertisements they saw on TV, heard on radio and read in fliers and magazines.

Focusing on children's questions

The physical environment and daily routines in schools provide many opportunities for stimulating technological activity. However, another way to introduce technology education to children is to set up situations in which children can pose questions and set up their own investigations. Vicky a preschool teacher had noticed that many robotic toys were being brought into her centre. Each time this occurred there was great enthusiasm displayed by the children. Vicky decided to harness this interest by using the toys (plus a valiant roamer - robot) to develop a technology unit.

At group time, Vicky encouraged the children to share their toys. They talked about the special features of each robot - what it looked like, how it moved, how it could be instructed, and what special features it had, such as playing music. As a group the children brain stormed everything they knew about robots. Vicky scribed this on butcher's paper fastened to an easel. In the process of recording all the ideas forthcoming from the group, the children began to ask questions about the robots, such as: Do robots need to sleep? Can robots do tricks? Can robots dance? Vicky responded firstly by labelling their responses: "That's a good question!". This was followed up with: "What other questions do you have about robots?". Finally she asked: "How could we find out the answers to these questions?".

The children set about using the robotic toys. Vicky and her assistant (plus a parent on duty) worked with the children writing down on butcher's paper what each robot could do. The children also discussed whether or not they could make their robot do tricks or dance. Finally, one of the groups recorded a list of the movements of their robot with corresponding commands. This led to designing a maze and listing a program that would move the robot around the maze. This gave the other groups a way of thinking about how they could make their robot dance - they listed the commands they needed for the complicated steps the robot had to take in order to dance! A range of programs were developed. They were recorded on firm card in pictorial format - so other children could enter in the commands and see the dance they had designed.

Conclusion

There are many other ways that technology can be introduced to very young children such as through children's literature, through nursery rhymes, and through art, music and drama. Technology education with its emphasis on designing, making and appraising

with materials, systems and information, extends children's learning opportunities. This framework provides another way of thinking for children as they engage in manipulating systems, information and materials. If we make the process explicit to children - as Karina did - then children will own and control the learning process.

Reference

Curriculum Corporation of Australia., (1994) *Technology - A curriculum profile for Australian schools*, Victoria: Curriculum Corporation